

# UTILIZATION OF FILTER HARMONIC CURRENT BASED ON SHUNT HPF WITHIN THE ACCEPTABLE IEEE -519 STANDARD

Mohamed A Omran 1, Izzeldin I Mohd 1, Abu Zaharin Ahmad 1, Mohamad M Almelian 1,  
Fahmi Samsuri 1, Muhamad Z. Sujod 1, Walid K A Hasan 2, and Mohamed Salem 3

1 Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang  
(UMP), 26600 Pekan, Pahang, Malaysia.

[omranmohamed346@yahoo.com](mailto:omranmohamed346@yahoo.com) ; [izzeldin@ump.edu.my](mailto:izzeldin@ump.edu.my) ; [zaharin@ump.edu.my](mailto:zaharin@ump.edu.my) ;  
[almalyan1984@yahoo.com](mailto:almalyan1984@yahoo.com) , [fahmi@ump.edu.my](mailto:fahmi@ump.edu.my) , [zahim@ump.edu.my](mailto:zahim@ump.edu.my)

2 Faculty of Engineering / Jadu, University of Aljabal Algharbi – Ghiryan, Libya  
[Walid.hasan@jgu.edu.ly](mailto:Walid.hasan@jgu.edu.ly)

3 School of Electrical and Electronic Engineering, Universiti Sains Malaysia (USM), Engineering  
Campus, 14300, Nibong Tebal, Pulau Pinang, Malaysia  
[salemm@usm.my](mailto:salemm@usm.my)

## Abstract:

Harmonic-related problems such as communication noise, malfunctioning of the solid-state control circuit, etc., are often encountered in industrial plants that have a significant amount of rectification. Different techniques to eliminate harmonics current from power systems to the ground have been proposed and one of them is shunt HPF which is an effective and widely-used method for power quality improvement. This paper presents the idea of reusing the HPF harmonic current created based on STF–SRF theory to feed AC load within the limits of IEEE - 519 (Less 5%). The circuit has been simulated in the MATLAB-Simulink and tested under distorted source voltage with varying loads. The outcomes of the simulations showed the THD at PCC to be less than 5% even when the HPF current was connected to the system (increasing the source current).

**Keywords:** Total Harmonic Distortion (THD); Passive power filter; Hybrid power filter; Self-tuning filter; LMBP controller.

**Acknowledgement**

This research is funded by University Malaysia Pahang, UMP Lab2Market Research Fund (UIC170901). This acknowledgment also goes to Faculty of Electrical and Electronics Engineering for providing us with facilities to conduct this research.